The Sun, Moon, and Stars Module consists of three sequential investigations, each designed to introduce students to objects we see in the sky. Through outdoor observations made during the day and at night, active simulations, readings, videos, and discussions, students study the Sun, Moon, and stars to learn that these objects move in regular and predictable patterns that can be observed, recorded, and analyzed.

FOSS EXPECTS STUDENTS TO

• Observe and record how the Sun, Earth’s star, rises in the east and sets in the west in a predictable pattern.
• Learn that Earth rotates on its axis, causing day and night. Day happens when a location on Earth is facing toward the Sun, and night happens when a location is facing away from the Sun.
• Understand that the exact path the Sun takes in the sky varies by season.
• Understand that shadows are the areas of darkness created when an opaque object blocks light and that shadows on Earth depend on the position of the Sun in the sky.
• Learn that Earth is one of several planets that orbit the Sun in the solar system.
• Learn that the Moon orbits Earth and can appear in the sky during both day and night; observe and record how the Moon changes its appearance or phase in a regular pattern over 4 weeks.
• Learn how useful telescopes are in studying the solar system, as they make distant objects look closer and larger.
• Learn that stars are suns positioned at great distances from Earth and form groups called constellations that appear to move together across the sky at night.
• Use tools to collect and analyze data to develop logical conclusions about the movements of objects in the sky.
FOSS AND NATIONAL STANDARDS

The Sun, Moon, and Stars Module emphasizes the development of observation and description skills and building explanations based on experience. This module supports the following National Science Education Standards.*

SCIENCE AS INQUIRY

Develop students’ abilities to do scientific inquiry.

- Ask and answer questions about objects and events in the environment.
- Use data to construct reasonable explanations.
- Communicate investigations and explanations.

CONTENT: EARTH AND SPACE SCIENCE

Develop students’ understanding of objects in the sky.

- The sun, moon, stars, clouds, birds, and airplanes all have properties, locations, and movements that can be observed and described.

Develop students’ understanding of changes in the earth and sky.

- Objects in the sky have patterns of movement. The sun, for example, appears to move across the sky in the same way every day, but its path changes slowly over the seasons. The moon moves across the sky on a daily basis much like the sun. The observable shape of the moon changes from day to day in a cycle that lasts about a month.


SCIENCE AND TECHNOLOGY

Develop students’ understanding about science and technology.

- People have always had questions about their world. Science is one way of answering questions and explaining the natural world.
- Women and men of all ages, backgrounds, and groups engage in a variety of scientific and technological work.
- Tools help scientists make better observations, measurements, and equipment for investigations. They help scientists see, measure, and do things that they could not otherwise see, measure, and do.

HISTORY OF SCIENCE

Develop students’ understanding of science as a human endeavor.

- Science and technology have been practiced by people for a long time.
- Many people choose science as a career and devote their entire lives to studying it. Many people derive great pleasure from doing science.

“Students can learn some things about scientific inquiry and significant people from history, which will provide a foundation for the development of sophisticated ideas related to the history and nature of science that will be developed in later years. Through the use of short stories, films, videos, and other examples, elementary teachers can introduce interesting historical examples of women and men (including minorities and people with disabilities) who have made contributions to science.”

**SYNOPSIS**

### 1. THE SUN

Students use a compass to study the position of the Sun in the sky at different times during the day. They observe the Sun's position, record, make predictions, and make new observations later in the day to check their predictions.

Students explore shadows created by blocking sunlight on the schoolyard. They trace shadows, predict where shadows will be later in the day, and return to check their predictions.

Students read about the changing position of the Sun in the sky.

### 2. THE MOON

Students observe the Moon in the sky during the day and night for a period of 4 weeks. They record the appearance of the Moon and analyze the data to discover a sequence of changes, the lunar cycle. Students learn the names of the Moon phases and how to predict the next step in the sequence. Concepts are reinforced through simulations, readings, a video, and writing.

### 3. THE STARS

Students look to the night sky to observe the stars and are introduced to the constellations people have named. Students engage in simulations to understand why the stars appear to move across the sky during the night and why different stars can be seen from Earth at different seasons.

Students read about the role of telescopes in astronomy research and about star scientists.

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**SCIENCE CONTENT**

- Day happens when a location on Earth is facing toward the Sun; night happens when a location on Earth is facing away from the Sun.
- The Sun appears to rise in the east and set in the west every day.
- A compass is a tool used to determine directions (east, west, north, south).
- Shadows are the areas of darkness created when an opaque object blocks light.
- The shapes of shadows change over a day and depend on the position of the Sun in the sky.
- The exact path the Sun takes in the sky varies by season.
- Objects in the night sky include the Moon, stars, and other planets.
- Earth is one of several planets that orbit the Sun in the solar system.
- The Moon orbits Earth.
- The Moon can appear in the sky during both night and day.
- The Moon changes its appearance, or phase, in a regular pattern over 4 weeks.
- Moon phase is the portion of the illuminated half of the Moon that is visible from Earth.
- Stars are suns positioned at great distances from Earth.
- Groups of stars form patterns called constellations.
- Stars (constellations) appear to move together across the night sky because Earth rotates.
- Stars can be observed from Earth’s surface only at night.
- Different constellations can be seen during different seasons because Earth revolves around the Sun.
- Stars are different sizes and have different brightnesses.
- Telescopes make distant objects look closer and larger.

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**THINKING PROCESSES**

- Observe and record the path the Sun takes in the sky.
- Observe and collect shadow data at different times of day.
- Analyze shadow data to develop an explanation about the Sun’s daily movements.
- Use shadow data to predict the position of the Sun in the sky.
- Use models to develop explanations.
- Communicate observations.

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**FULL OPTION SCIENCE SYSTEM**
### Reading and Writing

- **Sunrise and Sunset**
- **Changing Shadows**
- **Summary: The Sun**
- Science Notebook: Students record and predict the movement of the Sun. They respond to questions on the Sun and shadows.

### Extensions

- **Math Extensions**
  - Problem of the week.
  - Continue Sun tracking.
  - Find a schoolyard gnomon.

- **Language Extension**
  - Describe shadows.

- **Art Extension**
  - Create silhouettes.

### Assessment

- **Survey**
- Embedded Assessment
  - Science Notebook
- Benchmark Assessment
  - I-Check 1

<table>
<thead>
<tr>
<th>Activity</th>
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<tbody>
<tr>
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<tr>
<td>Changing Moon</td>
<td>Language</td>
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<tr>
<td>Summary: The Moon</td>
<td>Social</td>
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<tr>
<td>Science Notebook: Students record their observations of the Moon over time. They show their understanding of the lunar cycle.</td>
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<td>Math Extensions</td>
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<tr>
<td>Continue using Moon Calendar.</td>
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<td>Investigate eclipses.</td>
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<td>Language Extension</td>
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<td>Find out about the Apollo program.</td>
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<td>Social Studies Extension</td>
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<td>Read Moon myths and legends.</td>
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### SUN, MOON, AND STARS

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### Assessment

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- **Survey**
- Embedded Assessment
  - Science Notebook
- Benchmark Assessment
  - I-Check 2

- **Survey**
- Embedded Assessment
  - Science Notebook
- Benchmark Assessment
  - I-Check 3

- **Posttest**